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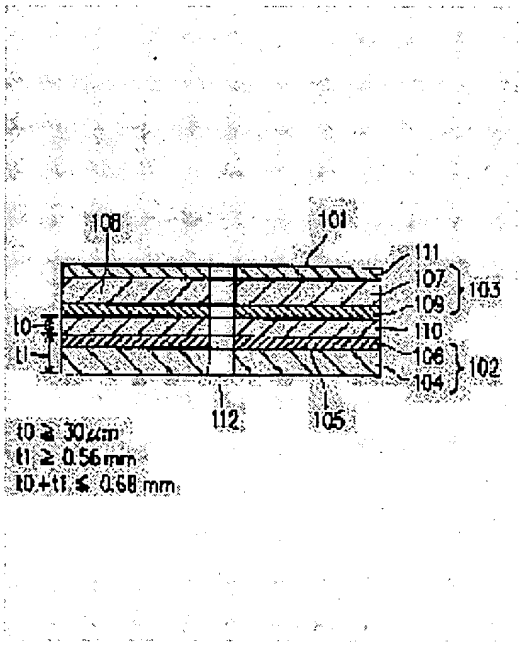
(54) OPTICAL RECORDING MEDIUM WITH TWO INFORMATION SURFACES

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a two-adhered optical disk of to make it possible to be continuously reproduced.

SOLUTION: A first translucent reflecting film 106 is formed on the first information surface 105 of a first optical disk 102, and a second reflecting film 109 is formed on the second information surface 108 of a second optical disk 103. The information surfaces of the first and second disks 102, 103 are approached, and adhered with transparent adhesive material to become a predetermined interval. Accordingly, an optical recording medium 101 can read the information recorded on both



the information carrying surfaces by emitting a light beam from one surface, and can continuously reproduce substantially double information.

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* NOTICES *

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2.**** shows the word which can not be translated.
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CLAIMS

[Claim(s)]
[Claim 1] the 1st substrate which has the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side It is the optical recording medium equipped with the glue line which pastes up this 1st substrate and the 2nd substrate so that the 2nd information side may counter. this -- the 1st information side -- this -- the thickness of this 1st substrate The sum total thickness which it is 0.56mm or more, and the thickness of this glue line is 30 micrometers or more, and added the thickness of this 1st substrate and the thickness of this glue line is an optical recording medium which is 0.68mm or less.
[Claim 2] It is the optical recording medium according to claim 1 whose thickness of this glue line the thickness of said 1st substrate is in within the limits from 0.56mm to 0.6mm, and is in within the limits from 40 micrometers to 60 micrometers.
[Claim 3] The optical recording medium according to claim 1 with which the record ingredient film for carrying out record playback of the information is prepared on said reflective film of said 2nd substrate.
[Claim 4] Said record ingredient film is an optical recording medium according to claim 3 currently formed from the phase change mold record ingredient.
[Claim 5] The optical recording medium according to claim 1 with which the label is prepared on the front face of said 2nd substrate.
[Claim 6] a spiral truck prepares on said 1st substrate and said 2nd substrate -- having -- **** -- this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from the field side where the 1st information side is opposite -- this -- the same optical recording medium according to claim 1 as the travelling direction of the spiral truck formed on the 2nd substrate.
[Claim 7] a spiral truck prepares on said 1st substrate and said 2nd substrate -- having -- **** -- this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from a different field side from the 1st information side -- this -- an optical recording medium [opposite to the travelling direction of the spiral truck formed on the 2nd substrate] according to claim 1.
[Claim 8] the 1st substrate which has the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side a different field from the 2nd information side of this 2nd substrate -- this 1st substrate -- this -- the glue line which pastes up this 1st substrate and the 2nd substrate so that the 1st information side may be countered -- having -- **** -- the optical recording medium with the almost same thickness of this 1st substrate and said 2nd substrate.
[Claim 9] The optical recording medium according to claim 8 with which the record ingredient film for carrying out record playback of the information is prepared between said 2nd information side of said 2nd substrate, and said reflective film.

[Claim 10] Said record ingredient film is an optical recording medium according to claim 9 currently formed from the phase change mold record ingredient.
[Claim 11] the 1st substrate which has the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side this 2nd substrate -- this -- a field opposite to the 2nd information side -- this 1st substrate -- this -- with the glue line which pastes up this 1st substrate and the 2nd substrate so that the 1st information side may be countered It has the label prepared on this reflective film of this 2nd substrate, and the thickness of this 1st substrate and said 2nd substrate is the almost same optical recording medium.
[Claim 12] The optical recording medium according to claim 11 with which the record ingredient film for carrying out record playback of the information is prepared between said 2nd information side of said 2nd substrate, and said reflective film.
[Claim 13] Said record ingredient film is an optical recording medium according to claim 12 currently formed from the phase change mold record ingredient.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention irradiates the light beam which it converged on a record medium, and relates to the optical record medium (optical recording medium) which detects the reflected light from a record medium and reproduces information. It is related with the optical recording medium especially equipped with two information sides.
[0002]
[Description of the Prior Art] In recent years, since an optical recording medium holds mass data and is reproducible, it is occupying a status important as what accumulates speech information data, image information data, and various information equipment datas. Furthermore large-capacity-izing or the miniaturization of equipment is called for, and in order to fill this demand, it is necessary to raise the storage capacity of a record medium further.
[0003] As an optical recording medium with the former only for playbacks, the compact disk (CD) which has one information side is known. This compact disk forms in a disc-like resin substrate front face with a thickness of 1.2mm the code track which consists of a concavo-convex pit in the shape of a spiral, prepares the reflective film and protective coats, such as aluminum, by technique, such as sputtering, on the information side of this substrate, and prints the label for identifying a disk on it.
[0004] An informational capacity of an information side is [the compact disk mentioned above] small because of the 1st page. in order to solve this -- 5" -- the record medium with the structure which stuck the disk of two sheets like an optical MAG (MO) disk is commercialized. There are a disk which has one information side, and two kinds of disks which have two information sides in this 5" MO disk. The disk which has one information side forms a concave convex guide rail in a disc-like resin substrate front face with a thickness of 1.2mm in the shape of a spiral, prepares reflective film, such as a dielectric film, magneto-optic-recording ingredient film, a dielectric film, and aluminum, by technique, such as sputtering, on it, and sticks a resin substrate with a thickness of 1.2mm on it. Moreover, the disk which has two information sides forms a concave convex guide rail in a disc-like resin substrate front face with a thickness of 1.2mm in the shape of a spiral, prepares reflective film, such as a dielectric film, magneto-optic-recording ingredient film, a dielectric film, and aluminum, by technique, such as sputtering, on it, and sticks the disk produced still in this way. 5" MO disk equipment is designed so that it can load with the disk of the both sides of the disk which has one information side, and the disk which has two information sides and record playback can be performed. A user chooses the disk which has one information side, when there is little information to record, and when recording mass information, he chooses the double-sided disk which has two information sides. Since common 5" MO disk equipment is equipped only with one optical head, in the case of the double-sided disk, a disk is removed, a field is reversed and record playback is performed.
[0005] Generally, the information density of a record medium needs to be decided by the information density of the pitch of a code track, and the direction of a truck, i.e., informational linear density, in order to raise the information density on a record medium, it needs to narrow a track pitch, and it needs

to make linear density high. Then, making thickness of a substrate thin with 0.6mm, reducing the aberration of the light beam by the inclination (tilt) of a disk, and attaining densification of an optical recording medium in recent years is examined.
[0006]
[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional technique, it is in the following problems. That is, since it is constituted so that information may be recorded or it reproduces recording information by irradiating a light beam from record-medium a top and the bottom in the case of the conventional double-sided optical recording medium, there are few locations which print the label for identifying a record medium, and handling is difficult. Moreover, when reproducing a double-sided optical recording medium, it is necessary to take out an optical recording medium and to reverse a field, and continuation playback cannot be performed with the equipment which has one optical head. In order to perform this automatically, it is necessary to prepare two optical heads up and down, and equipment becomes it is large and expensive.
[0007] In order to attain densification of an optical recording medium, when the optical recording medium of different substrate thickness from the thickness of the conventional optical recording medium is commercialized, it becomes impossible moreover, to reproduce the record medium with conventional equipment.
[0008] The place which it is made in order that this invention may solve the above-mentioned technical problem, and is made into the purpose is to offer the optical recording medium which label printing can be performed easily, can be automatically reproduced with one optical head, and has one information side, and the optical recording medium which has the information side which is two which can keep compatibility easy.
[0009] Moreover, other purposes of this invention are offering the optical recording medium which the optical recording medium with which the thickness of a substrate differs faces being commercialized, and can reproduce also with conventional equipment.
[0010]
[Means for Solving the Problem] the 1st substrate with which the optical recording medium of this invention has the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side It is the optical recording medium equipped with the glue line which pastes up this 1st substrate and the 2nd substrate so that the 2nd information side may counter. this -- the 1st information side -- this -- the thickness of this 1st substrate It is 0.56mm or more and the thickness of this glue line is 30 micrometers or more, the sum total thickness adding the thickness of this 1st substrate and the thickness of this glue line is 0.68mm or less, and the above-mentioned purpose is attained by that.
[0011] It is desirable that the thickness of said 1st substrate is in within the limits from 0.56mm to 0.6mm, and the thickness of this glue line is in within the limits from 40 micrometers to 60 micrometers.

[0012] With a certain operation gestalt, the record ingredient film for carrying out record playback of the information is prepared on said reflective film of said 2nd substrate.
[0013] With a certain operation gestalt, said record ingredient film is formed from the phase change mold record ingredient.
[0014] It is desirable that the label is prepared on the front face of said 2nd substrate.
[0015] a spiral truck prepares on said 1st substrate and said 2nd substrate -- having -- **** -- this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from the field side where the 1st information side is opposite -- this -- it may be the same as the travelling direction of the spiral truck formed on the 2nd substrate.
[0016] a spiral truck prepares on said 1st substrate and said 2nd substrate -- having -- **** -- this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from a different field side from the 1st information side -- this -- it may be opposite to the travelling direction of the spiral truck formed on the 2nd substrate.

[0017] the 1st substrate with which other optical recording media of this invention have the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side a different field from the 2nd information side of this 2nd substrate -- this 1st substrate -- this -- it has the glue line which pastes up this 1st substrate and the 2nd substrate so that the 1st information side may be countered, and the thickness of this 1st substrate and said 2nd substrate is almost the same, and the above-mentioned purpose is attained by that.
[0018] With a certain operation gestalt, the record ingredient film for carrying out record playback of the information is prepared between said 2nd information side of said 2nd substrate, and said reflective film.

[0019] With a certain operation gestalt, said record ingredient film is formed from the phase change mold record ingredient.
[0020] the 1st substrate with which the optical recording medium of further others of this invention has the 1st information side, and this 1st substrate -- this -- with the translucent reflective film formed on the 1st information side the 2nd substrate which has the 2nd information side, and this 2nd substrate -- this -- with the reflective film formed on the 2nd information side this 2nd substrate -- this -- a field opposite to the 2nd information side -- this 1st substrate -- this -- with the glue line which pastes up this 1st substrate and the 2nd substrate so that the 1st information side may be countered It has the label prepared on this reflective film of this 2nd substrate, and the thickness of this 1st substrate and said 2nd substrate is almost the same, and the above-mentioned purpose is attained by that.
[0021] Between said 2nd information side of said 2nd substrate, and said reflective film, the record ingredient film for carrying out record playback of the information may be prepared.
[0022] Said record ingredient film may be formed from the phase change mold record ingredient.
[0023]
[Embodiment of the Invention] Hereafter, this invention is explained to a detail with reference to a drawing.
[0024] (Example 1) Drawing 1 is the typical sectional view showing the 1st example of the optical recording medium by this invention. The optical recording medium 101 of this example is an optical recording medium of the one side reading method which made the 1st optical disk 102 and 2nd optical disk 103 rival. Such an optical recording medium can attain the engine performance which was extremely excellent as a digital video disc (DVD).
[0025] The 1st optical disk 102 has the 1st disc-like substrate 104 with which the code track which consists of a concavo-convex pit was formed in the front face (1st information side 105) in the shape of a spiral, and the 1st translucent reflective film 106 deposited by technique, such as sputtering, on the 1st [of the 1st substrate 104] information side 105. The 1st translucent reflective film 106 is formed from ingredients, such as gold (Au) and aluminum (aluminum). This 1st reflective film 106 reflects a part of laser beam for playback, and has the property which penetrates the remainder so that it may mention later. In order to demonstrate such a property, not only the quality of the material of the reflective film but its thickness needs to be adjusted to the suitable range. The thickness of the 1st reflective film 106 is preferably set as the range of 50 to 200A. In this example, the thickness of the 1st reflective film 106 is 100A.
[0026] Moreover, the 2nd optical disk 103 also has the 2nd disc-like substrate 107 with which the code track which consists of a concavo-convex pit was formed in the front face (2nd information side 108) in the shape of a spiral like the 1st optical disk 102, and the 2nd reflective film 109 deposited by technique, such as sputtering, on the 2nd [of this 2nd substrate 107] information side 108. The 2nd reflective film 109 is formed from aluminum etc.
[0027] On the 1st and the 2nd information side 105, and 108, information is recorded on high density by track pitch 0.74micrometer and about 0.4 micrometers of the shortest pit length. Thickness of the 2nd reflective film 109 is made smaller than the die length of the pit currently formed on the 2nd information side 108 so that the pit currently recorded on the 2nd information side 108 may be imprinted by the 2nd

reflective film 109 good. As for the thickness of the 2nd reflective film 109, specifically, it is desirable to be set as the range of 300-1500A. In this example, the thickness of the 2nd reflective film 109 is 500A.

[0028] As shown in drawing 1 , between the 1st optical disk 102 and the 2nd optical disk 103, the adhesion ingredient layer 110 for pasting up both optical disks is formed. This adhesion ingredient layer 110 is formed from an acrylic ultraviolet curing ingredient etc. After applying the ultraviolet curing ingredient film at least to one side of optical disks 102 and 103, both the optical disks 102 and 103 are made to rival, when pasting up both disks using an ultraviolet curing ingredient. Then, ultraviolet rays are irradiated at the resin film and both optical disks are pasted up by stiffening the resin film. Instead, other heat-curing mold adhesives may be used for an ultraviolet curing ingredient.

[0029] In addition, the label 111 for identifying a disk is stuck on the 2nd optical disk front face. Moreover, the installation hole (bore: 15mm) 112 for attaching an optical recording medium 101 in the motor for a drive is established in the core of an optical recording medium 101.

[0030] Next, the 1st and the 2nd information side 105, and playback of the information currently recorded on 108 are explained with reference to drawing 2 (a) and drawing 2 (b).

[0031] Drawing 2 (a) shows the case where the information currently recorded on the 1st information side 105 is read, and drawing 2 (b) shows the case where the information currently recorded on the 2nd information side 108 is read. It converges with a convergent lens 202 and the parallel light beam 201 is irradiated from a field [of a label 111], and opposite side 104, i.e., 1st substrate, side.

[0032] The convergent lens 202 is designed considering the thickness of a substrate as 0.6mm, and although it is natural, a disk with an equipped with one information side of the same configuration as the former substrate thickness of 0.6mm is also reproducible.

[0033] As shown in drawing 2 (a), when reproducing the information currently recorded on the 1st information side 105, it controls by known focal control so that the convergent point of a light beam 201 is located on the 1st information side 105, and the reflected light 203 of the light beam 201 reflected by the 1st reflective film 106 is separated with the separation component 204, a photodetector 205 detects, and information is read. Moreover, as shown in drawing 2 (b), when reproducing the information currently recorded on the 2nd information side 108, it controls so that the convergent point of a light beam 201 is located on the 2nd reflective film 109 by focal control, and the reflected light 206 of the light beam 201 reflected by the 2nd reflective film 109 is detected, and information is read. In order to reproduce the information currently recorded on the optical recording medium 101, it is necessary to make numerical aperture (NA) of 650nm and a convergent lens 202 about into 0.6 for the wavelength of a light beam 201.

[0034] When reproducing the information currently recorded on the 1st information side 105, as shown in drawing 2 (a), the reflected lights 203 and 206 penetrate a convergent lens 202, and are received with a photodetector 205. However, the beam spot of the light beam 201 on the 2nd reflective film 109 is dozens of micrometers, is very larger than track pitch 0.8micrometer and the 0.5 micrometers of the shortest pit length, and irradiates two or more pits. For this reason, the reflected light 206 has few each pit information components, and the quantity of light of the reflected light 206 becomes almost fixed as if it was reflected in respect of there being no pit. Furthermore, since the reflected light 206 which a part of reflected light 206 penetrated the convergent lens 202, and penetrated the convergent lens 202 does not turn into parallel light, the quantity of light of the reflected light 206 which reaches a photodetector 205 also becomes small. Therefore, the modulation component in the pit where the pit information detected with a photodetector 205 is recorded on the 1st information side 105 serves as most.

[0035] Moreover, as shown in drawing 2 (b), when reproducing the information currently recorded on the 2nd information side 108, similarly, the reflected lights 203 and 206 pass a convergent lens 202, and are received with a photodetector 205. However, the beam spot of the light beam 201 on the 1st reflective film 106 is very as large as dozens of micrometers, and since two or more pits are irradiated, each pit information component is hardly contained in the reflected light 203. Moreover, since the reflected light 203 which passed the convergent lens 202 does not turn into parallel light, the quantity of light of the reflected light 203 which reaches a photodetector 205 also becomes small. Therefore, the

modulation component in the pit where the pit information detected with a photodetector 205 is recorded on the 2nd information side 108 serves as most.

[0036] Next, the relation of the reflection factor of the 1st reflective film 106 and the 2nd reflective film 109 is explained. When reading the information currently recorded on the 1st information side 105, the more it raises the reflection factor of the 1st reflective film 106, the quantity of light of the reflected light 203 becomes large, and, the more the quality of a regenerative signal becomes good. However, when the information currently recorded on the 2nd information side 108 is read, Since the reflected light 206 in which the quantity of light of the light beam 202 which penetrates the 1st reflective film 106 was further reflected by the 2nd reflective film 109 by becoming small will penetrate the 1st reflective film 106 again if the 1st reflective film 106 is made high The quantity of light of the reflected light 206 at the time of reading the information currently recorded on the 2nd information side 108 becomes still smaller. When reading the information currently recorded on the 2nd information side 108, namely, a light beam 202 Penetrate the 1st substrate 104, the 1st reflective film 106, and the adhesion ingredient layer 110, and it reaches on the 2nd reflective film 109. Since the reflected light 206 reflected by the 2nd reflective film 109 passes the adhesion ingredient layer 110, the 1st reflective film 106, and the 1st substrate 104 again, the 1st reflective film 106 is passed twice. Therefore, if the reflection factor of the 1st reflective film 106 is made high, the quantity of light of the reflected light 206 at the time of reading the information currently recorded on the 2nd information side 108 will become small. Then, the optical recording medium 101 of this invention has set up the reflection factor of the 1st reflective film 106 and the 2nd reflective film 109 so that it may become almost the same as the quantity of light P1 of the reflected light 203 at the time of reading the information by which the quantity of light P2 of the reflected light 206 at the time of reading the information currently recorded on the 2nd information side 108 is recorded on the 1st information side 105. It will be set to k2=k1/(1-k1) 2 if the reflection factor of the k1 and 2nd reflective film 109 is set to k2 for the reflection factor of the 1st reflective film 106 in this case.

[0037] The quantity of light P1 of the reflected light 203 at the time of this reading the information currently recorded on the 1st information side 105 Since it is expressed with P2=P0xk2(1-k1) 2, the quantity of light P2 of the reflected light 206 at the time of reading the information which is expressed with P1=P0xk1 and is recorded on the 2nd information side 108 is calculated by being referred to as P1=P2. In addition, k1 and k2 are the numeric values showing the rate of the amount of reflected lights to the amount of incident light. Specifically, the optical recording medium 101 of this invention makes the reflection factor of the 2nd reflective film 109 60% or more for the reflection factor of the 1st reflective film 106 20 to 35%. Although the reflection factor of the 2nd reflective film 109 is so good that it is high, for obtaining the reflection factor near 100%, for example with cheap aluminum etc., it is necessary to set thickness to about 0.6 to 0.8 micrometers. On the other hand, in a high-density optical disk, the die length of a pit is set to about 0.5 micrometers, and if the thick reflective film of 0.6 to 0.8 micrometers is formed, imprint nature will fall. Then, in order not to reduce imprint nature, thickness of the reflective film is made into die length of 0.5 micrometers or less of the pit currently recorded on the 2nd information side 108, and the reflection factor is made into 60% or more.

[0038] Next, the aberration of the light beam 201 which it converges with a convergent lens 201 is explained. The optical recording media 101 of this invention differ as the optical path length added the 1st reflective film 106 and the thickness t0 of the adhesion ingredient layer 110 by the case where the case where the information currently recorded on the 1st information side 105 is read, and the information currently recorded on the 2nd information side 108 are read. In the optical recording medium 101 of this invention, since the thickness of the 1st reflective film 106 is 0.5 micrometers or less, it can be disregarded. Change of the optical path length, i.e., thickness, generates aberration in the light beam 201 which it converges with a convergent lens 201. This aberration becomes large in proportion to the 4th [about] power of NA of a convergent lens 201.

[0039] The relation of the thickness t1 of an objective lens 202 and the 1st substrate 104 is explained. Suppose that the thickness t1 of the 1st substrate 104 is thought also including the thickness of the 1st reflective film 106 in this specification and a drawing. The thickness 106 of the 1st reflective film is

because it can ignore to the thickness t1 of the 1st substrate 104, or the thickness t0 of the adhesion ingredient layer 110.

[0040] Generally, an objective lens 202 is designed in consideration of the thickness of a substrate. If thickness of the base material of the optical disk which has one information side is set to 0.6mm, an objective lens 202 will be designed considering the thickness of a substrate as 0.6mm. If thickness t1 of the 1st substrate 104 is set to 0.6mm when reproducing an optical recording medium 101 with this objective lens 202 Although there is no problem when reading the information currently recorded on the 1st information side 105, in reading the information currently recorded on the 2nd information side 108 For example, if thickness t0 of the adhesion ingredient layer 110 is set to 40 micrometers, these 40 micrometers will be added and it will become the case where the thickness of a substrate is 0.64mm, with equivalence mostly. Therefore, since aberration becomes large when reading the information currently recorded on the 2nd information side 108, a reproductive signal quality deteriorates. Then, what is necessary is to set thickness t1 of the 1st standard substrate 104 to 0.58mm, and just to make thin thickness of the base material of the optical disk which has two information sides from the thickness of the base material of the optical disk which has one information side a little, when the objective lens 202 is designed considering the thickness of a substrate as 0.6mm. The thickness of the substrate in the case of reading the information currently recorded on the 1st information side 105, if it does in this way 0.58mm, Since the thickness (distance from the optical plane of incidence of the 1st substrate) of the substrate in the case of reading the information currently recorded on the 2nd information side 108 is set to 0.62mm and it becomes [as opposed to / both / the design value of 0.6mm of an objective lens 202] 20-micrometer difference It becomes almost the same about the quality of the regenerative signal in the case of reading the case where the information currently recorded on the 1st information side 105 is read, and the information currently recorded on the 2nd information side 108. Although it is natural, and it generates with a manufacture upper bed in the thickness t1 of the 1st substrate 104, and the thickness t0 of the adhesion ingredient layer 110, the allowed value to this dispersion also spreads.

[0041] The relation between the thickness t1 of the 1st substrate 104 and the thickness t0 of the adhesion ingredient layer 110 is further explained with reference to (c) from drawing 7 (a). (c) shows the result of having made as an experiment and measured various optical recording media, from drawing 7 (a), the distance (Distance) from the front face of the 1st substrate 104 in which a light beam carries out incidence to an information side is shown for an axis of abscissa, and the jitter value (Jitter) of a regenerative signal is shown for the axis of ordinate. The jitter value shows the value which did the division of the standard-deviation value of time-axis fluctuation of a regenerative signal with the period of a channel clock. Drawing 7 (a) makes four kinds of 1st optical disk 102 whose thickness t1 of the 1st substrate 104 is 0.56mm, 0.57mm, 0.62mm, and 0.63mm as an experiment, and shows the measured value at the time of reproducing the 2nd optical disk 103 and the pasted-up optical recording medium in the adhesion ingredient layer 110 with a thickness of 30 micrometers. 71 shows the value of the jitter obtained when the information currently recorded on the 1st information side 105 was reproduced, and 72 shows the value of the jitter obtained when the information currently recorded on the 2nd information side 108 was reproduced. Drawing 7 (b) makes four kinds of 1st optical disk 102 whose thickness t1 of the 1st substrate 104 is 0.56mm, 0.57mm, 0.58mm, and 0.61mm as an experiment, and shows the measured value at the time of playing the 2nd optical disk 103 and the pasted-up optical disk in the adhesion ingredient layer 110 with a thickness of 40 micrometers. 73 shows the value of the jitter obtained when the information currently recorded on the 1st information side 105 was reproduced, and 74 shows the value of the jitter obtained when the information currently recorded on the 2nd information side 108 was reproduced. Drawing 7 (c) shows the measured value at the time of playing the optical disk on which three kinds whose thickness t1 of the 1st substrate 104 is 0.61mm, 0.62mm, and 0.63mm of the 1st optical disk 102 and 2nd optical disk 103 were pasted up in the adhesion ingredient layer 110 with a thickness of 50 micrometers. 75 shows the value of the jitter obtained when the information currently recorded on the 1st information side 105 was reproduced, and 76 shows the value of the jitter obtained when the information currently recorded on the 2nd information side 108 was reproduced.

[0042] When reproducing the information currently recorded on the disk, by vibration, an impact, etc.

which are added to the face deflection of TISUKU, eccentricity, or equipment from the outside, defocusing and an off-track occur and, thereby, the jitter of a regenerative signal deteriorates. Moreover, even if a disk and the optical axis of a light beam incline, the jitter of a regenerative signal deteriorates. The curvature of this disk changes also with environmental variations, such as humidity. Moreover, there is manufacture variation in an optical head and there is also aging. Therefore, in order to enable it to reproduce with equipment the information currently recorded on the disk with sufficient dependability, when degradation of the jitter by various factors mentioned above is taken into consideration, about 10% of the jitter of a regenerative signal is a limitation.

[0043] The following thing can be said if drawing 7 (a) is compared with drawing 7 (b). When the thickness t0 of the adhesion ingredient layer 110 is 30 micrometers, the regenerative-signal jitter of the 1st information side hardly changes, even if the thickness t1 of a substrate 104 changes from 0.56mm to 0.63mm, but is about 9.5%, but when the thickness t0 of the adhesion ingredient layer 110 is 40 micrometers, the jitter of the regenerative signal of the 1st information side becomes so high that the thickness t1 of a substrate 104 becomes thin. This shows that the effect of the leakage lump signal from the 2nd information side is larger than the effect of the aberration by change of the thickness t1 of a substrate 104, if the thickness t0 of the adhesion ingredient layer 110 is set to 30 micrometers. Moreover, if thickness t0 of the adhesion ingredient layer 110 is made thinner than 30 micrometers, the leakage lump signal from the 2nd information side will become still larger, and it will be expected that the quality of a regenerative signal deteriorates rapidly. Therefore, it is necessary to set thickness t0 of the adhesion ingredient layer 110 to 30 micrometers or more.

[0044] Moreover, from drawing 7 (b), the thickness t1 of a substrate 104 is missing from 0.56mm from 0.58mm, and it can be said that the regenerative-signal jitter of the 1st information side 105 shows the property (inclination) which becomes large rapidly. This is because the effect of the aberration by thickness t1 change of a substrate 104 becomes large rather than the effect of the leakage lump signal from the 2nd information side, when the thickness t0 of the adhesion ingredient layer 110 is 40 micrometers. Since the secondary [about] value of the jitter of a regenerative signal changes functionally to change of the thickness t1 of a substrate 104, if thickness t1 of a substrate 104 is set to 0.56mm or less, it will be expected that the jitter of a regenerative signal becomes large rapidly. Therefore, it is necessary to set thickness t1 of a substrate 104 to 0.56mm or more.

[0045] It becomes substrate thickness in case the thing (t0+t1) adding the thickness t1 of the 1st substrate 104 and the thickness t0 of the adhesion ingredient layer 110 reproduces the information currently recorded on the 2nd information side 108. From the result of drawing 7 (c), the property that the thing (t0+t1) adding the thickness t1 of the 1st substrate 104 and the thickness t0 of the adhesion ingredient layer 110 is missing from 0.68mm from 0.66mm, and the jitter of a regenerative signal becomes large rapidly is shown, and the secondary [about] value of a jitter changes functionally to change of the thickness of a substrate 104. For this reason, if substrate thickness (t0+t1) is set to 0.69mm, it will be expected that the jitter of a regenerative signal exceeds 10%. Therefore, in order to make the jitter of a regenerative signal 10% or less, it is necessary to set the thing (t0+t1) adding the thickness t1 of the 1st substrate 104, and the thickness t0 of the adhesion ingredient layer 110 to 0.68mm or less.

[0046] There are too little allowances for a severe inspection of each part article being needed in securing the dependability of near and equipment in a limitation, and mass-producing many values mentioned above, and equipment becomes expensive. In order to make equipment easy to manufacture, it is necessary to enlarge allowances. Hereafter, this point is explained.

[0047] The effect of the leakage lump signal from the 2nd information side is mitigated, so that the thickness t0 of the adhesion ingredient layer 110 is thick, when reproducing the information currently recorded on the 1st information side 105. When reproducing the information currently recorded on the 1st information side 105 by the comparison with drawing 7 (a) and drawing 7 (b), it is desirable to set thickness t0 of the adhesion ingredient layer 110 to 40 micrometers or more. Furthermore, if thickness of the 1st substrate 104 is set to 0.56 micrometers or more, the jitter of a regenerative signal can be made about 8%.

[0048] Moreover, when the distance from the front face of the 1st substrate 104 to [from drawing 7 (a)] an information side is 0.66mm, the jitter of a regenerative signal is 7.5%. Similarly, it is 6.6% at the time of drawing 7 (b) to 0.65mm. Moreover, if it is 8.8% at the time of 0.68mm and 0.66mm is similarly exceeded 7.8% 7% from drawing 7 (c) at the time of 0.67mm at the time of 0.66mm, the jitter of a regenerative signal will increase rapidly. Therefore, it is desirable to set to 0.66mm or less the thing adding the substrate thickness at the time of reproducing the information currently recorded on the 2nd information side 108, i.e., the thickness t1 of the 1st substrate 104 and the thickness t0 of the adhesion ingredient layer 10.

[0049] When the convergent lens 202 is designed noting that the thickness of a substrate is 0.6mm, as for the thickness of a substrate, changing focusing on 0.6mm is desirable. For this reason, if thickness of the 1st substrate 104 is set to 0.56mm or more, the thickness of the 1st substrate 104 will be set to 0.58mm**0.02mm. Therefore, in order to set the thing adding the thickness of the 1st substrate 104, and the thickness of the adhesion ingredient layer 110 to 0.66mm or less, it is necessary to set thickness of the adhesion ingredient layer 110 to 60 micrometers or less.

[0050] If thickness t0 of the adhesion ingredient layer 110 is set to 40 to 60 micrometers and thickness t1 of a substrate 104 is set to about 0.6mm from 0.56mm from the above thing, both the regenerative-signal jitters of the 1st information side 105 and the 2nd signal side 108 are low, and it turns out that the regenerative signal of very good quality is acquired.

[0051] Next, the spiral direction of the truck of the 1st optical disk 102 and the 2nd optical disk 103 is explained. For example, interactive playback becomes easy, in case it will reproduce with one optical head if the spiral truck of the 1st optical disk 102 shall run in the direction of a periphery from inner circumference, and the spiral truck of the 2nd optical disk 103 is also made to run in the direction of a periphery from inner circumference. For example, the software of the game which has two or more branching is separated and recorded on two information sides of an optical disk, and it becomes possible to carry out a focal jump to the 1st information side 105 in an instant from the 1st information side 105 to 2nd information side 108, or 2nd [its] opposite information side 108, and to perform a game by branch instruction.

[0052] Moreover, if the spiral truck of the 1st optical disk 102 runs in the direction of a periphery from inner circumference and the spiral truck of the 2nd optical disk 103 is made to run in the direction of inner circumference from a periphery, for example, continuous playback will become easy in case it reproduces with one optical head. Namely, when information which transports an optical head towards a periphery from inner circumference, and is recorded on the 1st information side 105 is reproduced and an optical head reaches the periphery section A focal jump is carried out from the 1st information side 105 to the 2nd information side 108 in an instant, and if it is made to reproduce information which transports an optical head to inner circumference from a periphery, and is recorded on the 2nd information side 108, continuation playback of a prolonged movie etc. will become easy. In this case, what is necessary is to see from the 1st substrate 104 side and just to carry out the travelling direction of a spiral truck reversely with the 1st optical disk 102 and 2nd optical disk. In order to do in this way, in case the original recording of a disk is cut, the 1st optical disk 102 transports an optical head in the direction of a periphery from inner circumference, and records a signal, and the 2nd optical disk 103 reverses the 1st optical disk and hand of cut, carries out optical head migration from a periphery at inner circumference, and should just record a signal.

[0053] Since according to the 1st example of this invention the 1st optical disk and 2nd optical disk are pasted up with the adhesives which have predetermined thickness, a light beam is irradiated from the field of one side and the information side of the 1st and the 2nd both sides can be reproduced, the field of another side can be made into a label side. Moreover, since the information currently recorded on both information sides is reproducible only by changing the location of the convergent point of a light beam with one optical head according to the 1st example of this invention, interactive playback or continuous playback of a prolonged movie is attained, and equipment can be made cheap. Moreover, since the 1st optical disk and 2nd optical disk have the same thickness, there is little formation of a form status change to humidity etc., and since adhesion also becomes easy, they become cheap [a disk].

[0054] (Example 2) The example of the 2nd this invention which can maintain the transposition between the equipment with which reproducible substrate thickness differs hereafter is explained with reference to a drawing.
[0055] Even if the thickness of a reproducible substrate depends drawing 3 on the equipment which is 1.2mm, it is the type section Fig. showing the optical disk which can be read also with the equipment whose thickness of a reproducible substrate is 0.6mm.
[0056] The optical optical recording medium 301 of this example makes the 1st optical disk 302 and 2nd optical disk 303 with which the same information is recorded mutually rival. The 1st optical disk 302 forms in the front face of the 1st disc-like substrate 304 with a thickness of 0.6mm the code track which consists of a concavo-convex pit in the shape of a spiral, and forms the 1st translucent reflective film 306 by technique, such as sputtering, on the 1st [of this 1st substrate 304] information side 305. Moreover, the 2nd optical disk 303 is completely recorded with the gestalt with the same information with the 1st optical disk 302. That is, the code track which consists of a concavo-convex pit is formed in the front face of the 2nd disc-like substrate 307 with a thickness of 0.6mm in the shape of a spiral, and the 2nd reflective film 309, such as aluminum, is formed by technique, such as sputtering, on the 2nd [of this 2nd substrate 307] information side 308. A label for adhesion ingredient layers, such as an ultraviolet curing ingredient for 310 to paste up the 1st optical disk 302 and 2nd optical disk 303, and 311 to identify a disk and 312 are the installation holes of an optical recording medium 301.
[0057] The 1st and the 2nd information side 305, and playback of the information currently recorded on 308 are explained with reference to drawing 4 (a) and (b). Drawing 4 (a) shows the case where the information by which reproducible substrate thickness is recorded on the 1st information side 305 using the equipment which is 0.6mm is read. Drawing 4 (a) is fundamentally [as drawing 2 (a)] the same, it converges with the convergent lens 202 for substrate thickness 0.6mm, and the parallel light beam 201 is irradiated from the 1st substrate 304 side. And the reflected light 203 of the light beam 201 reflected by the 1st reflective film 306 is separated with the separation component 204, a photodetector 205 detects, and information is read. Drawing 4 (b) shows the case where the information currently recorded on the 2nd information side 308 with the equipment whose reproducible substrate thickness is 1.2mm is read.
[0058] As shown in drawing 4 (b), when reproducing the information currently recorded on the 2nd information side 308, it converges with the convergent lens 402 for substrate thickness 1.2mm, and the parallel light beam 401 is irradiated from the 1st substrate 304 side, penetrates the 1st substrate 304, the 1st reflective film 306, the adhesion ingredient layer 310, and the 2nd substrate 307, and reaches on the 2nd information side 308. And the 2nd substrate 307, the adhesion ingredient layer 310, the 1st reflective film 306, the 1st substrate 304, and a convergent lens 403 are passed again, it dissociates with the separation component 404, and the reflected light 406 reflected by the 2nd reflective film 309 is received with a photodetector 405. The reflected light 406 of the light beam 401 reflected by the 2nd reflective film 309 is detected, and information is read.
[0059] When reproducing the information currently recorded on the 1st information side 305, as shown in drawing 4 (a), the reflected lights 203 and 206 pass a convergent lens 202, and are received with a photodetector 205. however, the quantity of light of the reflected light 206 which reaches a photodetector 205 since the reflected light 206 which was very as large as 1mm or more as for the beam spot of the light beam 201 on the 2nd reflective film 309, and irradiated two or more pits, and passed the convergent lens 202 does not turn into parallel light -- very -- small -- becoming -- a photodetector 205 -- the pit information component of the 2nd information side 308 -- it is not detected most. Moreover, as shown in drawing 4 (b), when reproducing the information currently recorded on the 2nd information side 308, similarly, the reflected lights 403 and 406 pass a convergent lens 402, and are received with a photodetector 405. however -- since the reflected light 403 which was very as large as 1mm or more as for the beam spot of the light beam 401 on the 1st reflective film 306, and irradiated two or more pits, and passed the convergent lens 402 does not turn into parallel light -- a photodetector 405 -- the pit information component of the 1st information side 305 -- it is not detected most.
[0060] In the optical recording medium 301 of this invention shown in drawing 3 , the relation of the reflection factor of the 1st reflective film 306 and the 2nd reflective film 309 is fundamentally the same

as the case of the optical recording medium of drawing 1 . However, it is not necessary to imprint the information currently recorded on the 2nd information side 308 on the 2nd reflective film 309 in an optical recording medium 301. For this reason, a reflection factor is made to 90% or more in that which can thicken the reflective film.

[0061] As mentioned above, when reproducing the optical recording medium 301 of this invention shown in drawing 3 with the equipment for 1.2mm substrates, a light beam 401 passes the 1st and 2nd substrate 304 and 307, the 1st reflective film 306, and the adhesion ingredient layer 310. For this reason, if thickness of the 1st and 2nd substrate 304 and 307 is set to 0.6mm, although it can ignore, only the thickness of the adhesion ingredient layer 310 will become thick, and aberration will generate the thickness of the 1st reflective film 306. Therefore, it is desirable to make thickness of the adhesion ingredient layer 310 thin to dozens of micrometers or less in an optical recording medium 301. Moreover, only the thickness of the adhesion ingredient layer 310 may make thickness of the 2nd substrate 307 thin.

[0062] Moreover, in respect of [308] the 1st information 305 and the 2nd information, a format may be carried out, if it is **. For example, the information recorded on the 2nd information side 308 is recorded in a format of the conventional compact disk (CD), and it enables it to reproduce with the CD player which has generally spread widely. In this case, what is necessary is for the consistency of CD to be low, and to record all movies on the 1st information side 305, and just to record what edited the movie into the 2nd information side 308, and cut the part, for example, since capacity drops to several [1/]. In this case, since the wavelength of a light beam is 780nm, playback of CD reflects a 650nm light beam for the optical property of the 1st reflective film 306, and since the property of making a 780nm light beam penetrating, then the amount of reflected lights increase, its S/N of a regenerative signal improves.

[0063] Although the 2nd example of this invention was explained above, since the same information is recorded on the 1st optical disk and 2nd optical disk, according to the 2nd example of this invention, the information same also as the regenerative apparatus for 1.2mm of substrate thickness or the regenerative apparatus for 0.6mm can be read. Moreover, since a light beam is irradiated and the information side of the 1st and the 2nd both sides can be reproduced from the field of one side, the field of another side can be made into a label side.

[0064] Next, it has the 1st information side only for playbacks, and the 2nd information side which can carry out record playback, and the example of the 3rd this invention which irradiates a light beam and can perform informational playback or record from the field of one side is explained with reference to a drawing.

[0065] (Example 3) Drawing 5 is the sectional view on which the configuration of the optical disk of the 3rd this invention was exaggerated and drawn. An optical recording medium 501 sticks the 1st optical disk 502 only for playbacks, and the 2nd optical disk 503 for record playback. The 1st optical disk 502 forms in the front face of the disc-like substrate 504 with a thickness of 0.6mm the code track which consists of a concavo-convex pit in the shape of a spiral, and forms the translucent reflective film 506 by technique, such as sputtering, on the 1st [of this substrate 504] information side 505. The concave convex slot truck where the thickness of the substrate of the 2nd optical disk 503 is minute in a substrate front face at 0.58mm is formed in the shape of a spiral. As for an adhesion ingredient layer for 510 to paste up the 1st optical disk 502 and 2nd optical disk 503 and 511, a label and 512 are the installation holes of an optical recording medium 101.

[0066] Like the optical recording medium 101 shown in Fig. 1, it pastes up in the adhesion ingredient layer 510 so that the distance of the 1st information side 505 only for playbacks and the 2nd information side for record playback may be set to about 40 micrometers, and the optical recording medium 501 of this invention shown in drawing 5 is constituted so that a light beam may be irradiated from the 1st optical disk 502 side.

[0067] The 2nd optical disk 503 is explained with drawing 6 . Drawing 6 carries out expansion exaggeration and shows the sectional view when cutting an optical disk 503 to radial. The concave convex slot truck 602 is formed on one front face of a substrate 601. and a it top -- the reflective film

603, such as aluminum, and SiO2 etc. -- it is a **** thing one by one by technique, such as sputtering, about a dielectric film 604, the record ingredient film 605, and a dielectric film 606. The reflective film 603 is formed in order to raise sensibility, and to make heat dissipation good and to protect the record ingredient film 605 from a thermal shock. The record ingredient film 605 forms the phase change mold record ingredient which used Te (tellurium), Sb (antimony), and germanium (germanium) as the principal component by technique, such as sputtering. Dielectric films 604 and 606 are for protecting the record ingredient film 605 from humidity or a thermal shock, and can be omitted.

[0068] If it is quenched after becoming a crystalline substance and fusing it, if a phase change mold record ingredient is annealed after heating it, it has the property which becomes amorphous. Using this property, a phase change mold disk changes a crystallized state and amorphous state reversibly, and can carry out overwrite of the information to the same location any number of times like magnetic disks, such as a floppy disk or a hard disk. When recording information on a phase change mold disk, a disk is rotated at the rate of predetermined, carrying out tracking control so that a light beam may be located on a slot truck, according to the signal to record, between non-crystallizing level and crystallization level, it becomes irregular in strength and reinforcement of a light beam is performed. For example, in recording that a record mark will be in amorphous state, the light beam of the quantity of light of extent which fuses a thin film is irradiated, the mark of amorphous state is formed, and periods other than a record mark irradiate the light beam of the quantity of light of extent which is not fused, and crystallize. Therefore, if the former condition of periods other than a record mark will probably be amorphous and they will be crystalline substances, they will be in a crystallized state, and even if information is the location already recorded, they can carry out an exaggerated light. In order to reproduce the information currently recorded on this phase change mold disk, it carries out by amorphous state and the crystallized state using a reflection factor differing from permeability. For example, a weak fixed light beam is irradiated, the reflected light from a disk is received with a photodetector, and information is reproduced by change of the amount of reflected lights.

[0069] As mentioned above, although the optical recording medium 501 of this invention is constituted so that a light beam may be irradiated from the 1st optical disk 502 side, it explains this reason. The 2nd optical disk 503 for record playback needs to make the absorption coefficient of a light beam high with about 60%, in order to record by the light beam of the small quantity of light, since information is recorded with the heat which absorbs a light beam. If it follows, for example, a reflection factor is made into about 20%, permeability will become about 20%. The amount of reflected lights at the time of reading the information currently recorded on them on the 1st information side 505 if it constitutes in the example and reverse of drawing 5 so that incidence of the light beam may be carried out from the 2nd optical disk 503 side becomes very small. For example, in the reflection factor of the reflective film 506, if the 2nd optical disk 503 is passed twice also as 100%, the amount of reflected lights will turn into about 4% of the quantity of light of an incident light beam. On the other hand, the absorption coefficient of the light beam of the 2nd optical disk can be made, and since it constitutes from an optical recording medium 501 of this invention so that a light beam may be irradiated from the 1st optical disk 502 side, a reflection factor can be made into 40% 60%. And for example, if the reflection factor of the reflective film 506 is made into 20%, when reading the information currently recorded on the 1st information side 505, about 20% of reflected light of the quantity of light of an incident light beam is obtained, and when reading the information currently recorded on the 2nd optical disk 503, about 26% of reflected light of the quantity of light of an incident light beam will be obtained. Since the irradiated light beam receives a big modulation by the pit currently recorded on the 1st information side 505 when playing the 1st optical disk 502 only for playbacks, even if it reduces the reflection factor of the reflective film 506 to about 20%, a fully quality regenerative signal is acquired.

[0070] As mentioned above, since the optical recording medium 501 of this invention is constituted so that a light beam may be irradiated from the 1st optical disk 502 side only for playbacks, it can reproduce the both sides of the 1st optical disk 502 and the 2nd optical disk with sufficient dependability.

[0071] Although the 3rd example of this invention was explained above, since the optical recording

medium 501 of this invention pastes up the 1st optical disk 502 and 2nd optical disk 503 with the adhesives which have predetermined thickness, irradiates a light beam from the field of one side and can reproduce the information side of the 1st and the 2nd both sides, it can make the field of another side a level side. Moreover, since the information currently recorded on both information sides is reproducible only by changing the location of the convergent point of a light beam with one optical head, interactive playback is attained and equipment can be made cheap. Furthermore, since the optical disk only for playbacks and the optical disk for record playback are one sheet, if it processes the information currently recorded, for example on the optical disk only for playbacks and is made to record on the optical disk for record playback, since the related information is always accumulated in the optical disk of one sheet, handling will become very easy. Moreover, since the 1st optical disk 502 and 2nd optical disk 503 have the same thickness, there is little formation of a form status change to humidity etc., and since adhesion also becomes easy, they become cheap [an optical recording medium].

[0072] In addition, also in the optical recording medium of an example 2, the record ingredient film 605 used in the example 3 and the same record ingredient film may be prepared on the 2nd information side 308. In this case, the record ingredient film is arranged between the 2nd information side 308 and the 2nd reflective film 309 in the 2nd optical disk 303.

[0073]

[Effect of the Invention] Since according to this invention the 1st optical disk in which the translucent reflective film was formed on the 1st signal side which records information, and the 2nd optical disk in which the reflective film was formed on the 2nd signal side which records information are pasted up with the transparent binder so that an information side may approach, the information which irradiates a light beam and is recorded on both ****** from one front face can be read. Therefore, the information are twice [about] many as this is continuously reproducible. Moreover, since it becomes possible to prepare a label on the surface of one side, discernment of an optical disk becomes easy.

[0074] Moreover, by having set the 1st thickness and charge layer thickness of a binder of a substrate as predetermined magnitude, both the regenerative-signal jitters of the 1st information side and the 2nd signal side are low, and the regenerative signal of good quality is acquired.

[0075] Moreover, thickness of the 1st substrate and the 2nd substrate is made almost the same, and according to the optical recording medium pasted up so that a different field from the 2nd information side of the 2nd substrate may counter the 1st information side of the 1st substrate, the regenerative apparatus for 1.2mm of substrate thickness or the regenerative apparatus for 0.6mm can also read information, for example.

[0076] Moreover, since the related information is accumulated in the optical recording medium of one sheet whenever it processes the information currently recorded on the optical disk only for playbacks and makes it record on the optical disk for record playback when the optical disk only for playbacks and the optical disk for record playback are pasted up for example, handling becomes very easy.

[Translation done.]

* NOTICES *

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3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The sectional view of the 1st example of the optical recording medium by this invention.
[Drawing 2] For (a), the explanatory view for explaining the optical path of the reflected light beam at the time of reproducing the information on the 1st information side in the 1st example of this invention and (b) are an explanatory view for explaining the optical path of the reflected light beam at the time of reproducing the information on the 2nd information side in the 1st example of this invention.
[Drawing 3] The sectional view of the 2nd example of the optical recording medium by this invention.
[Drawing 4] For (a), the explanatory view for explaining the optical path of the reflected light beam at the time of reproducing the information on the 1st information side in the 2nd example of this invention and (b) are an explanatory view for explaining the optical path of the reflected light beam at the time of reproducing the information on the 2nd information side in the 2nd example of this invention.
[Drawing 5] The sectional view of the 3rd example of the optical recording medium by this invention.
[Drawing 6] The expanded sectional view for explaining the configuration of the 2nd optical disk in the 3rd example of the optical recording medium by this invention.
[Drawing 7] (c) is a graph which shows various results of having carried out the optical-recording-medium prototype and having measured the jitter from (a).
[Description of Notations]
101 Optical Recording Medium
102 1st Optical Disk
103 2nd Optical Disk
104 1st Substrate
105 1st Information Side
106 1st Reflective Film
107 2nd Substrate
108 2nd Information Side
109 2nd Reflective Film
110 Adhesion Ingredient Layer
111 Label
112 Installation Hole
301 Optical Recording Medium
302 1st Optical Disk
303 2nd Optical Disk
304 1st Substrate
305 1st Information Side
306 1st Reflective Film
307 2nd Substrate
308 2nd Information Side
309 2nd Reflective Film

310 Adhesion Ingredient Layer
311 Label
312 Installation Hole
501 Optical Recording Medium
502 1st Optical Disk
503 2nd Optical Disk
504 1st Substrate
505 1st Information Side
506 1st Reflective Film
508 2nd Information Side
510 Adhesion Ingredient Layer
511 Label
512 Installation Hole

[Translation done.]

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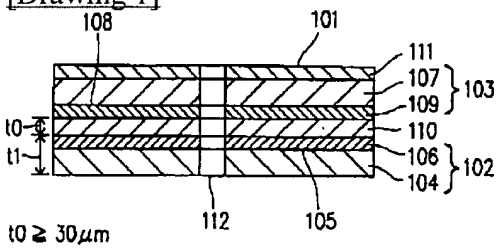
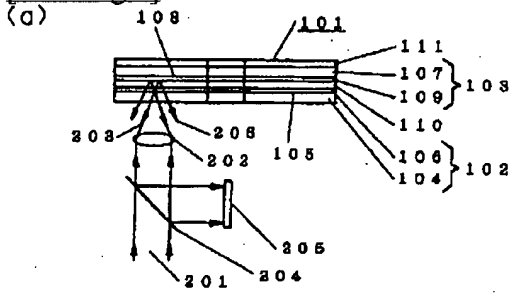
DRAWINGS

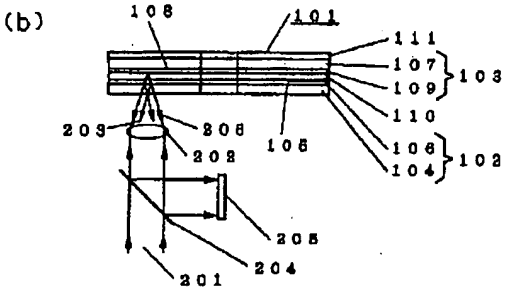
[Drawing 1]



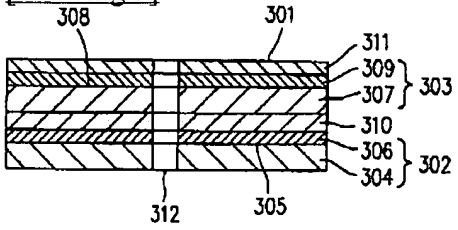
t0 ≧ 30μm
t1 ≧ 0.56mm
t0+t1 ≦ 0.68mm

[Drawing 2]

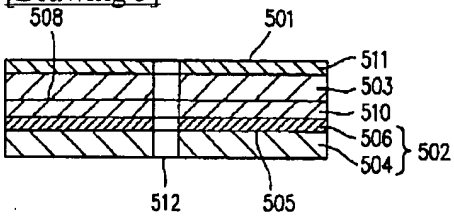




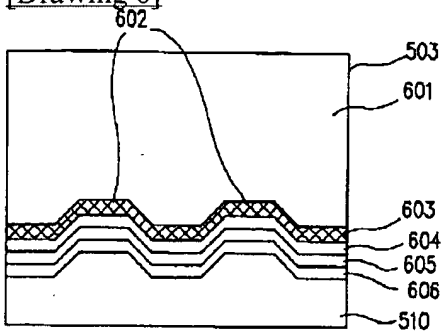
[Drawing 3]



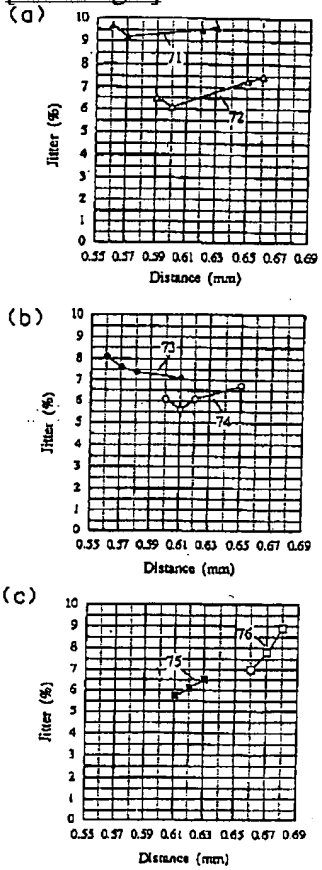
[Drawing 5]



[Drawing 6]

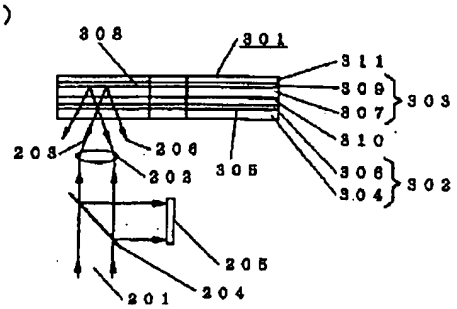


[Drawing 7]

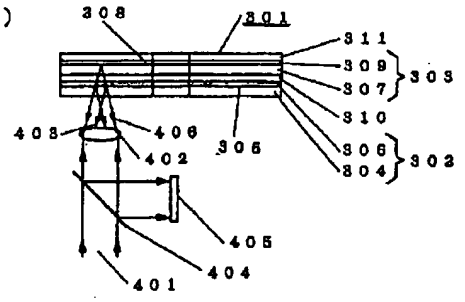


[Drawing 4]

(a)



(b)



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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
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[Procedure revision]
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[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] The name of invention
[Method of Amendment] Modification
[Proposed Amendment]
[Title of the Invention] Optical disk
[Procedure amendment 2]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] The 1st substrate which has the 1st information side,
this 1st substrate -- this -- the translucent reflective film formed on the 1st information side,
The 2nd substrate which has the 2nd information side,
this 2nd substrate -- this -- the reflective film formed on the 2nd information side,
this -- the 1st information side -- this -- the glue line which pastes up this 1st substrate and the 2nd

substrate so that the 2nd information side may counter,
It is preparation **********,
The thickness of this 1st substrate is 0.56mm or more,
The thickness of this glue line is 30 micrometers or more,
The sum total thickness adding the thickness of this 1st substrate and the thickness of this glue line is an optical disk in within the limits from 0.59mm to 0.68mm.
[Claim 2] The thickness of said 1st substrate is in within the limits from 0.56mm to 0.6mm,
The thickness of this glue line is in within the limits from 40 micrometers to 60 micrometers,
The sum total thickness adding the thickness of this 1st substrate and the thickness of this glue line is an optical disk according to claim 1 in within the limits from 0.60mm to 0.68mm.
[Claim 3] The 1st substrate which has the 1st information side,
this 1st substrate -- this -- the translucent reflective film formed on the 1st information side,
The 2nd substrate which has the 2nd information side in which the record ingredient film for carrying out record playback of the information is prepared,
this -- the 1st information side -- this -- the glue line which pastes up this 1st substrate and the 2nd substrate so that the 2nd information side may counter -- having
this -- the 1st information side -- and -- this -- the optical disk constituted so that the information currently recorded on the 2nd information side may be read through this 1st substrate.
[Claim 4] Said record ingredient film is an optical disk according to claim 3 which is phase change mold record film.
[Claim 5] The optical disk according to claim 1 to 4 with which the label is prepared on the front face of said 2nd substrate.
[Claim 6] The spiral truck is formed on said 1st substrate and said 2nd substrate,
this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from a field side opposite to the 1st information side -- this -- the same optical disk according to claim 1 to 5 as the travelling direction of the spiral truck formed on the 2nd substrate.
[Claim 7] The spiral truck is formed on said 1st substrate and said 2nd substrate,
this 1st substrate -- this -- the travelling direction of the spiral truck established in this 1st substrate when this spiral truck is seen from a different field side from the 1st information side -- this -- an optical disk [opposite to the travelling direction of the spiral truck formed on the 2nd substrate] according to claim 1 to 5.
[Claim 8] The 1st substrate which has the 1st information side,
this 1st substrate -- this -- the translucent reflective film formed on the 1st information side,
The 2nd substrate which has the 2nd information side,
this 2nd substrate -- this -- the reflective film formed on the 2nd information side,
a field opposite to the 2nd information side of this 2nd substrate -- this 1st substrate -- this -- the glue line which pastes up this 1st substrate and this 2nd substrate so that the 1st information side may be countered -- having -- ****
the thickness of this 1st substrate and this 2nd substrate -- almost -- the same -- this -- the information currently recorded on the 1st information side this 1st substrate -- letting it pass -- this -- it reads from a 1st substrate side -- having -- this -- the information currently recorded on the 2nd information side -- this 2nd substrate and this glue line -- this -- the translucent reflective film and this 1st substrate -- letting it pass -- this -- the optical disk constituted so that it may be read from a 1st substrate side.
[Claim 9] The optical disk according to claim 8 with which the record ingredient film for carrying out record playback of the information is prepared between said 2nd information side of said 2nd substrate, and said reflective film.
[Claim 10] Said record ingredient film is an optical disk according to claim 9 which is phase change mold record film.
[Claim 11] The optical disk according to claim 8 to 10 which prepared in said reflective film side of said 2nd substrate, and was equipped with the </U> **** label.
[Claim 12] The 1st substrate which has the 1st information side,

this 1st substrate -- this -- the translucent reflective film formed on the 1st information side,
The 2nd substrate which has the 2nd information side,
this 2nd substrate -- this -- the reflective film formed on the 2nd information side,
this 2nd substrate -- this -- a field opposite to the 2nd information side -- this 1st substrate -- this -- the glue line which pastes up this 1st substrate and this 2nd substrate so that the 1st information side may be countered -- having -- ****
this 1st substrate, this 2nd substrate, and the sum total thickness adding this glue line -- about 1.2mm -- it is -- this -- the information currently recorded on the 1st information side this 1st substrate -- letting it pass -- this -- it reads from a 1st substrate side -- having -- this -- the information currently recorded on the 2nd information side -- this 2nd substrate and this glue line -- this -- the translucent reflective film and this 1st substrate -- letting it pass -- this -- the optical disk constituted so that it may be read from a 1st substrate side.
[Claim 13] The optical disk according to claim 12 which has the label prepared in the field by the side of said reflective film of said 2nd substrate of said optical disk.
[Claim 14] The 1st substrate which has the 1st information side,
this 1st substrate -- this -- the 1st reflective film formed on the 1st information side,
The 2nd substrate which has the 2nd information side,
this 2nd substrate -- this -- the 2nd reflective film formed on the 2nd information side,
this 2nd substrate -- this -- a field opposite to the 2nd information side -- this 1st substrate -- this -- the glue line which pastes up this 1st substrate and this 2nd substrate so that the 1st information side may be countered -- having -- ****
This 1st reflective film reflects the light of the 1st wavelength, and it has the optical property of making the light of the 2nd wavelength penetrating,
the light of this 1st wavelength -- this -- it uses in order to read the 1st information recorded on the 1st information side -- having -- the light of this 2nd wavelength -- this -- the 2nd information recorded on the 2nd information side -- this 2nd substrate and this glue line -- this -- the optical disk used in order to read through the 1st reflective film and this 1st substrate.
[Claim 15] The thickness of said 1st substrate and said 2nd substrate is the almost same optical disk according to claim 14.
[Claim 16] An optical disk given in either of claims 14 and 15 said 1st substrate, said 2nd substrate, and whose sum total thickness adding said glue line are 1.2mm.
[Claim 17] It is the optical disk according to claim 14 to 16 said whose 1st wavelength is 650nm and said whose 2nd wavelength is 780nm.
[Claim 18] It is the optical disk according to claim 14 to 17 with which said 2nd information side is recording information in this 1st format and the 2nd different format by said 1st information side recording information in the 1st format.
[Claim 19] Said 1st format is an optical disk according to claim 18 which has information recording density higher than said 2nd format.
[Claim 20] The optical disk according to claim 14 to 19 which has the label prepared in the field by the side of the 2nd [of said optical disk / said] reflective film.

[Translation done.]